REMARKS

This is in response to the Office Action dated April 23, 2003. Claims 1-60 have been canceled. New claims 61-140 have been added. Thus, claims 61-140 are now pending.

Applicant would initially like to thank Examiners Schechter and Parker for the courtesy extended during the personal interview held at the USPTO on July 17, 2003. The substance of the interview is set forth below.

The title has been amended as suggested by the Examiner.

Section 112 Rejection

With respect to the Section 112 rejections, all previous claims have been canceled, thereby rendering the Section 112 rejections moot.

However, with respect to the final paragraph of the previous Section 112 rejection, the Examiner's attention is directed to claim 94 for example. Claim 94 states that the "antiglare layer suppresses coloration at a viewing angle of 50° so that the antiglare layer causes a chromaticity value (x, y) of the liquid crystal display to be characterized by a relationship of $x \leq 0.3581$ and $y \leq 0.3675$ when the viewing angle is 50°, *while at the same time a white image is displayed at a normal viewing angle*." In other words, this means that the LCD at the same time both (a) displays a white image at the 0 degree normal viewing angle, and (b) this image has a chromaticity value (x, y) relationship of $x \leq 0.3581$ and $y \leq 0.3675$ at a viewing angle of 50 degrees. Thus, with respect to the final paragraph of the Examiner's previous Section 112 rejection, this new claim language clearly does

not read on an LCD merely displaying a blue image. The point here is that the recited x and y values are achieved, due to the antiglare film, when the LCD is displaying a white image at the normal viewing angle. New claim 94 is respectfully submitted to be clear and definite. See also new claim 108 in this respect.

Example Problem in Art and Example Embodiments of Invention

Tilted retarders (or compensators) are sometimes used in LCDs in order to improve viewing characteristics such as contrast ratios at high viewing angles (e.g., see U.S. Patent Nos. 5,506,706 and 5,583,679). Unfortunately, while such tilted retarders improve contrast ratios, they tend to cause undesirable yellowish coloration at high viewing angles (e.g., pg. 5, line 18 to pg. 6, line 6).

The instant inventors have found that the aforesaid problem caused by tilted compensators can be solved through the use of a special type of antiglare film located at the viewing side of the LCD. While certain known antiglare films (e.g., see U.S. Patent No. 6,164,785 to Maekawa; and U.S. Patent No. 6,483,561 filed in an IDS dated July 15, 2003) may reduce the aforesaid undesirable coloration to some extent, they are still commercially deficient.

Surprisingly, the instant inventors have found that the aforesaid problem can be more satisfactorily and better solved through the use of an antiglare film which satisfies a particular relationship between its specular reflection characteristic and its specular transmission characteristic. Conventional antiglare films used in LCDs are typically of either the surface scattering type or the internal scattering type. Unexpectedly, the instant

inventors have found that by using an antiglare film which uses *both* surface scattering and internal scattering, undesirable yellow coloration at high viewing angles can be effectively suppressed.

It has been found that the balance between the specular reflection characteristic and the specular transmission characteristic is often important in reducing undesirable coloration at high viewing angles while at the same time allowing viewing characteristics at the normal viewing angle to remain good. An example of this relationship is an antiglare film having a haze value of at least 15 and a value of transmitted image clarity of at least 10 as measured with an image clarity meter in which a width of an optical comb is 0.5 mm (e.g., pg. 23, line 26 to pg. 25, line 3). The instant inventors have unexpectedly found that by using an antiglare film having both an internal scattering layer and a scattering surface, this balance can effectively be achieved thereby allowing undesirable yellow coloration at high viewing angles to be better suppressed. In other words, the use of such an antiglare film unexpectedly causes high x/y color values to be reduced at high LCD viewing angles.

Example Support in Specification for Certain Claim Language

New claim 94 states that antiglare layer suppresses coloration at a viewing angle of 50° so that the antiglare layer causes a chromaticity value (x, y) of the liquid crystal display to be characterized by a *relationship of* $x \leq 0.3581$ *and* $y \leq 0.3675$ *when the viewing angle is 50°*. Example support may be found in the instant specification at page 29. Table 3 of the instant specification includes range limits of 0.3581 and 0.3675 for x and

y, respectively, at a 50 degree viewing angle. Values x and y increase toward yellow. Thus, it can be seen that the invention of claim 94 requires that the yellow coloration be suppressed at the viewing angle of 50 degrees.

New claim 108 calls for a relationship of $x \leq 0.3647$ and $y \leq 0.3650$ when the viewing angle is 60 degrees. Again, Table 3 on page 29 of the instant specification includes range limits of 0.3647 and 0.3650 for x and y, respectively, at a viewing angle of 60 degrees.

New claims 65, 83 and 122 state that, for the internal scattering portion of the antiglare layer or film, the difference in refractive index between the particles and the polymer matrix is within a range of 0.03 to 0.10 in terms of absolute value. For example support, see the instant specification at pages 44-45. In particular, see the last line of Table 12 on page 44 which provides the endpoints of the 0.03 to 0.10 range in terms of absolute value.

Claims 61 & 79

Claim 61 defines over the cited art for at least the following reasons.

Claim 61 requires that "the phase compensation element comprises indices of refraction na, nb and nc, and directions corresponding thereto, wherein na>nb and nc>nb, wherein the direction corresponding to nb is inclined with respect to a direction normal to the liquid crystal layer in at least part of the phase compensation element, and wherein a haze value of the antiglare layer is equal to or greater than 15 and a value of transmitted image clarity of the antiglare layer is equal to or greater than 10 as measured with an

image clarity meter in which a width of an optical comb is 0.5 mm, and wherein the antiglare layer has an internal scattering layer and a scattering surface." As explained above, it has surprisingly been found that the balance between the specular reflection characteristic and the specular transmission characteristic is often important in reducing undesirable coloration at high viewing angles while at the same time allowing viewing characteristics at the normal viewing angle to remain good. An example of a predetermined relationship which has been found to be particularly beneficial in this respect is an antiglare film having a haze value of at least 15 and a value of transmitted image clarity of at least 10 as measured with an image clarity meter in which a width of an optical comb is 0.5 mm (e.g., pg. 23, line 26 to pg. 25, line 3). The instant specification makes clear that antiglare layers with haze values less than the claimed range are not particularly helpful in this respect (e.g., see Samples A201 and A202 in Tables 1-2 on pgs. 28-29). Moreover, the instant inventors have unexpectedly found that by using an antiglare film having *both an internal scattering layer and a scattering surface*, the aforesaid balance can effectively be achieved thereby allowing undesirable yellow coloration at high viewing angles to be better suppressed. In other words, the use of such an antiglare film unexpectedly causes high x/y color values typically induced by tilted compensators to be reduced at high LCD viewing angles. The cited art fails to disclose or suggest the aforesaid quoted and underlined aspect of claim 61.

Maekawa clearly fails to disclose or suggest a haze value of at least 15 as required by claim 61. Moreover, Maekawa is also fundamentally flawed in that *Maekawa has no*

internal scattering layer. Maekawa's antiglare film is of the surface-scattering type, and its undulations are provided solely to cause surface unevenness to occur which in turn causes surface scattering. Maekawa's antiglare layer is entirely unrelated to the invention of claim 61 in each of these two respects.

Etori is also problematic in that it has no scattering surface. As explained above, conventional antiglare films used in LCDs are typically of either the surface scattering type (Maekawa) or the internal scattering type (Etori). Unexpectedly, the instant inventors have found that by using an antiglare film which uses *both* surface scattering and internal scattering, undesirable yellow coloration at high viewing angles can be effectively suppressed. In this respect, Etori teaches away from the invention of claim 61 since it requires that no scattering surface be present for its scattering film.

Accordingly, it can be seen that the cited art fails to disclose or suggest the invention of claim 61.

Claim 79 requires that "a haze value of the antiglare layer is equal to or greater than 15 and a value of transmitted image clarity the antiglare layer is equal to or greater than 10 as measured with an image clarity meter in which a width of an optical comb is 0.5 mm, and wherein the antiglare layer has an internal scattering layer and a scattering surface." As explained above with respect to claim 61, the cited art fails to disclose or suggest these aspects of claim 79.

Claims 94, 107 & 108

Claim 94 requires that the "antiglare layer suppresses coloration at a viewing angle of 50° so that the antiglare layer causes a chromaticity value (x, y) of the liquid crystal display to be characterized by a relationship of $x \leq 0.3581$ and $y \leq 0.3675$ when the viewing angle is 50°, while at the same time a white image is displayed at a normal viewing angle." Values x and y increase toward yellow. Thus, it can be seen that the invention of claim 94 requires that the yellow coloration be suppressed at the viewing angle of 50 degrees.

The cited art fails to disclose or suggest the aforesaid aspect of claim 94. Maekawa and Etori are unrelated to the invention of claim 94 in this respect. Moreover, the reference relied upon in the Office Action (Liu) is also deficient. In particular, Liu merely states that "the color dispersion is much less than that of a conventional 90° twisted nematic LCD." Liu does not disclose or suggest any sort of antiglare film, let alone one that can suppress yellow coloration at high viewing angles to achieve the values required by claim 94.

Moreover, with respect to claim 107, Liu relates to a vertical alignment type LCD, and is thus entirely unrelated to twisted type LCDs.

Claim 108 requires that "the antiglare layer suppresses coloration at a viewing angle of 60 degrees and causes a chromaticity value (x, y) of the liquid crystal display to have a relationship of $x \leq 0.3647$ and $y \leq 0.3650$ when the viewing angle is 60 degrees, and at the same time a white image is displayed at a normal viewing angle." As explained

above with respect to claim 94, the cited art fails to disclose or suggest the invention of claim 108 in at least this respect.

Claim 121

Claim 121 requires "an antiglare film provided on a viewer side of one of the pair of polarizers which is provided closer to a viewer, wherein the antiglare film has an internal scattering layer and a scattering surface; and wherein the internal scattering layer of the antiglare film includes a polymer matrix and particles dispersed in the polymer matrix, and a difference in refractive index between said particles and said polymer matrix in which the particles are provided is significant so as to cause internal scattering in the antiglare film." As explained above, the instant inventors have unexpectedly found that by using an antiglare film having *both an internal scattering layer and a scattering surface*, the aforesaid balance can be effectively achieved thereby allowing undesirable yellow coloration at high viewing angles to be better suppressed. In other words, the use of such an antiglare film unexpectedly causes high x/y color values typically induced by tilted compensators to be reduced at high LCD viewing angles. The cited art fails to disclose or suggest the aforesaid quoted and underlined aspect of claim 121.

As explained above, conventional antiglare films used in LCDs are typically of either the surface scattering type (Maekawa) or the internal scattering type (Etori) – but not both as called for in claim 121. Maekawa has no internal scattering layer, and Etori has not scattering surface. Thus, both teach directly away from the invention of claim 121.

As mentioned above, the instant inventors have found that by using an antiglare film which uses *both* surface scattering and internal scattering, undesirable yellow coloration at high viewing angles can be effectively suppressed. The cited art fails to disclose or suggest this.

Conclusion

All claims are believed to be in condition for allowance. If any minor matter remains to be resolved, the Examiner is invited to telephone the undersigned with regard to the same.

Respectfully submitted,

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